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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KILPATRICK, BRYAN T	

ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,977	YANO ET AL.	
	Examiner	Art Unit	
	BRYAN T. KILPATRICK	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *13-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-12, drawn to a target substance detection device having a periodic structure, an electromagnetic wave-projecting means, a detecting means, and temperature and polarization controlling means.

Group II, claim(s) 13-28, drawn to a target substance detection device having a flow path, periodic structure, an electromagnetic wave-projecting means, and a detecting means.

Group III, claim(s) 29-31, drawn to a target substance detection device having an optical fiber, an electromagnetic wave-projecting means, and a detecting means.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the common technical feature in all groups is a substance detection device having an

electromagnetic wave-projecting means and a detecting means. However, the special technical feature of claims 1-31 does not constitute as a special technical feature under PCT Rule 13.2 because the feature is recited in U.S. Patent 3,947,123 (CARLSON et al.). CARLSON et al. recites in claims 7-15, an apparatus for identifying specific particles contained in a sample using a beam of monochromatic electromagnetic wave energy and a detector.

Applicant's election **with traverse** of **Group I, claim 1-12** in the reply filed on 05 March 2009 is acknowledged. The traversal is on the ground(s) that "there would not be undue burden in examining the three groups of claims in a single application." This is not found persuasive because the technical feature, a substance detection device having an electromagnetic wave-projecting means and a detecting means, is recited in U.S. Patent 3,947,123 (CARLSON et al.) in claims 7-15. The technical feature recited in the instant claims can not be considered a "special technical feature" under PCT Rule 13.2 since the feature is not "a contribution which each of the claimed inventions, considered as a whole, makes over the prior art." (MPEP Appendix T – Patent Cooperation Treaty, Rule 13: Unity of Invention)

The requirement is still deemed proper and is therefore made FINAL.

Claims 13-31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 05 March 2009.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 7-10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication 2002/0191884 A1 (LETANT et al.).

Instant claim 1 recites a device for detecting a target substance in a fluid, comprising a periodic structure having a vacant portion for passing a fluid containing the target substance and a solid portion capable of transmitting an electromagnetic wave arranged regularly to form a periodic distribution of a refractive index for the electromagnetic wave, an electromagnetic wave-projecting means for projecting the electromagnetic wave to the periodic structure, and a detecting means for measuring the magnetic wave emitted from the periodic structure to detect a change in the periodic distribution of the refractive index. Instant claim 2 recites wherein a trapping substance capable of bonding selectively to the target substance is disposed on the surface of the solid portion, and a change in the periodic distribution of the refractive index caused by

bonding the target substance to the trapping substance is detected. Figures 5-6 and paragraphs [0005]-[0011] of LETANT et al. disclose a device and method both having: photonic waveguide filters with a plurality of pores patterned leading to a photonic hand gap; chemical or biological target specific anchors attached to the walls of the pores; a waveguide system comprised of a light source, at least one silicon waveguide filter as previously stated, a detector, and a computer for data analysis.

Instant claim 3 recites the periodic structure forbids transmission of the electromagnetic wave in a specific wavelength band depending on the periodic distribution of the refractive index. Paragraph [0005] discloses the use of at least one silicon wafer having a plurality of through pores distributed according to a designed pattern leading to a photonic band gap, which is designed to act as the photonic crystals built to present a periodic variation of refractive index that is controlled by changing the periodicity and introducing point or line defects in the photonic crystal (paragraph [0003]).

Instant claim 4 recites the electromagnetic wave-projecting means for projecting the electromagnetic wave projects an electromagnetic wave with a wavelength near an edge of the wavelength band and the detecting means measures the intensity of emitted electromagnetic wave. Paragraph [0049] discloses the use of a light source and detecting means for analysis.

Instant claim 5 recites the periodic structure has a defect in the regular arrangement of the vacant portion and the solid portion to provide an electromagnetic wave-transmissive wavelength range in the wavelength band where the electromagnetic

wave propagation is forbidden, the electromagnetic wave-projecting means projects the electromagnetic wave in the electromagnetic wave-transmissive wavelength range to the periodic structure, and the detecting means measures the electromagnetic wave of the electromagnetic wave-transmissive wavelength range emitted from the periodic structure. Paragraph [0051] discloses the introduction of defects in the waveguide to increase sensitivity of a particular wavelength as compared to others.

Instant claim 7 recites the device has additionally a polarization controlling means for controlling polarization of the electromagnetic wave. Paragraph [0003] disclose the controlling the propagation of electromagnetic waves by changing the periodicity and introducing point or line defects in the photonic crystal.

Instant claim 8 recites the electromagnetic wave projected to the periodic structure has a continuous wavelength component, and the detecting means measures the spectrum of the electromagnetic wave emitted from the periodic structure. Instant claim 9 recites the electromagnetic wave is projected through a collimating means onto the periodic structure, and the detecting means measures the direction of transmission of the electromagnetic wave. Paragraph [0049] and Figure 6 disclose light from a source being directed via a fiber optic and a lens, which is then detected by a detector after passing through the waveguide component.

Instant claim I0 recites the device has additionally a first aligning means for aligning the electromagnetic wave emitted from the electromagnetic wave-projecting means to enter the periodic structure at a prescribed position at a prescribed angle, and a second aligning means for aligning the electromagnetic wave to reach the detecting

means. Paragraph [0049] and Figure 6 disclose light from a source being directed via a fiber optic and a lens, and a microscope objective to focus the light produced from analysis into a detector.

Instant claim 12 recites the solid portion is a continuous body and the vacant portion is constituted of holes penetrating the continuous body. Paragraph [0005] and Figures 1A-1B disclose the use of a silicon filter having pores.

Claim 11 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent Application Publication 2002/0191884 A1 (LETANT et al.).

Instant claim 11 the solid portions of the structure are columnar, and the vacant portion is an interstice among the structure. Paragraph [0022] of LETANT et al. discloses the use of cylinders for perfect crystals and for crystals with defects as part of an investigation of electromagnetic wave propagation conducted by a disclosed reference.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2002/0191884 A1 (LETANT et al.) as applied to claim 1 above, and further in view of U.S. Patent 3,973,118 (LaMONTAGNE).

Instant claim 6 recites the device has additionally a temperature controlling means for controlling the temperature of the periodic structure. LETANT et al. discloses a device and method both having: photonic waveguide filters with a plurality of pores patterned leading to a photonic hand gap; chemical or biological target specific anchors attached to the walls of the pores; a waveguide system comprised of a light source, at least one silicon waveguide filter as previously stated, a detector, and a computer for data analysis (Figures 5-6 and paragraphs [0005]-[0011]). LETANT et al. does not expressly disclose a temperature controlling means. However, LaMONTAGNE discloses a device that can be used as a thermal detector by analyzing electromagnetic radiant output in lines 39-42 of column 2. It would have been obvious to one of ordinary skill in the art to employ the device of LaMONTAGNE with the device of LETANT et al. for the purpose of a thermal detector since the LaMONTAGNE device is designed to

detect different electromagnetic energy wavelengths simultaneously and nearly instantaneously (LaMONTAGNE; lines 46-50, column 1).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,280,960 (CARR) discloses a method and apparatus for particle detection of biological molecules and viruses utilizing a light source and detection means in the Abstract and Figures 1-3.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYAN T. KILPATRICK whose telephone number is (571)270-5553. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Samuel P Siefke/
Primary Examiner, Art Unit 1797

BK
AU 1797